BIO-DATA

1.	**Name**	**:**	**Dr. GURMEL SINGH MUDAHAR**
2.	**Designation**	**:**	Professor
3.	**Department**	**:**	Physics
4.	**Date of Birth**	**:**	April 1, 1954
5.	**Address for Correspondence**	**:**	466, Urban Estate - I Patiala - 147002, India.
	Phones	**:**	0175-2282141 (Res.) **09501965200**
	e-mail	**:**	dr_gurmel@rediffmail.com
6.	**Areas of Specialization**	**:**	Radiation Physics, Nuclear Physics & Material Science

7. Academic Qualifications:

S. No.	Degree Held	Year	Board/Univ./Inst.	Div./ Rank	Subjects Taken
1	Matric	1972	Punjab School Education Board (India)	1st	Eng, Pbi, S.St., Maths, Sci. etc.
2	Intermediate	1974	Punjabi University, Patiala (India)	1st	Phys, Chem, Maths.
3	B.Sc.	1976	-do-	1st	Phys, Chem, Maths.
4	M.Sc.	1978	-do-	1st	Physics
5	M.Phil.	1984	-do-	1st	Physics
6	Ph.D.	1986	-do-	-	Physics

1. Membership of Professional Bodies/Organizations

i) Indian Society for Radiation Physics.
ii) Nuclear Track Society of India.
iii) Punjab Academy of Sciences

9. Medals/Awards/Honours/Received

i) Roll of Honour (1st Position in Univ. in B.Sc.-I)

10. Scholarships:

i) State Merit Scholarship for B.Sc.
ii) State Merit Scholarship for M.Sc.
iii) Junior Research Fellowship for Ph.D.
iv) Senior Research Fellowship for Ph.D.

11. Details of Experience:

S. No.	Name of the Inst./Employer	Position Held	Duration	Major Job Responsibilities and Nature of Experience
1.	Punjab Agric. Univ. Ludhiana (India)	Assistant Professor	Sept. 85 - March 88	Teaching and Research
2.	Punjabi Univ. Patiala (India)	Lecturer	March 88 - July 98	Teaching and Research
3.	-do-	Reader	July 98 – July 2006	Teaching and Research
4.	-do-	Professor	July 2006 to date	Teaching and Research

12. Published Work (Please specify numbers only):

Research Papers:

In Journals = 64 (National = 15 + International = 49)
In Conf./Semi./Symp. = 87 (National = 70 + International = 17)

Books : 1 (Rdiation Effects on Glasses) Lambert Academic Publishing.

13. R & D Projects

S. No.	Title	Sponsoring Agency	Status
1.	Search for a suitable equation to describe gamma ray transmission in soil system	U.G.C.	Completed (1989-91)
2.	Attenuation coefficients and effective atomic number studies of composite materials like soil	D.S.T.	Completed (1990-92)
3.	Buildup factor studies in low-Z composite materials	C.S.I.R.	Completed (1996-99)
4.	Gamma ray buildup and multiple scattering studies in low-Z composite materials	U.G.C.	Completed (1999-01)
5.	Associated with Departmental Research projects (DSA,FIST, COSIST etc.)	U.G.C.	On going

14. Invited Talks/Articles:

Delivered different kinds of academic and popular lectures at school, college and university level and have written many articles for magazines, news papers, books etc.

15. Ph.D. Students guided / under guidance:

S. No.	Name of the Student	Title of Thesis	Year of Completion
1.	Makhan Singh	Behaviour of Gamma Ray Interactions in Composite Materials	1992
2.	G.S. Brar	Gamma Ray Buildup and Multiple Scattering Studies in Composite Materials	1996
3.	G.S. Sidhu	Study of Gamma-Ray Interactions in Some Low-Z Composite Materials	1999
4.	Karamjit Singh	Investigations of Gamma-Ray Transmission Properties in Multielemental Materials	2002
5.	Bal Krishan	Growth and Characterization of $Ga_xIn_{(1-x)}Sb$ Crystals for Device Applications	2002
6.	Charanjeet Singh	Multiple Scattering Studies in Low-Z Composite Materials	2004
7.	Ashok Kumar	Study of gamma ray absorption parameters in low-Z materials	2006
8.	Tejbir Singh	Study of Multiple Scattering of Gamma Rays in Composite Materials	2006
9.	Sukhpal Singh	Study of gamma ray interactions in flyash materials	2008
10.	Jarnail Singh	Preparation and Characterization of Commercial Glasses	2009
11.	Devinder Singh	Effect of gamma-irradiation on Optical and Physical Properties of Borosilicate and Borate Oxide Glasses.	2010
12.	Vandana	Preparation of Transition metal based borate glasses and their optical and structural characterization	2012

13.	Manjitinder Kaur	Preparation and Characterization of Lithium based glasses	Working
14.	Kanwaldeep Singh	A study of gamma ray interactions in flyash shielding concretes	Working
15.	Harjinder Singh	A study of gamma ray interaction in clay-flyash bricks	Working
16.	Vimal Mehta	Estimation of natural radioactivity in environment and naturally occuring materials	Working
17.	Rama Arora	Tribological studies of aluminium alloy-rutile composite developed through stir casting route	Working
18.	Anju Sharma	Wear characteristics of aluminium alloy-garnet composite developed through stir casting technique	Working
19.	Ravinder Singh	To be decided	Working

16. M. Phil. Students guided:

S. No.	Name of the Student	Title of Thesis	Year of Completion
1.	Sanjay Modi	Energy Dependence of Attenuation Coefficients and Effective Atomic Number of Soils	1990
2.	H.S. Mann	Mass Attenuation Coefficients and Z_{eff} Studies of Dielectric Materials	1990
3.	Karamjit Singh	To Study Buildup Factor for Multielemental Materials	1992
4.	Apjit Kaur Sandhu	A Statistical Approach for Predicting Accuracies of Soil Properties measured by Gamma Ray Transmission Method	1993
5.	Darashpreet Singh	Study of Different Factors Influencing the Stability of Nuclei of Various Elements	2002
6.	Sanjeev Kumar	Statistics in Measurement of Nuclear Radiations: A Study	2003

17. List of Papers/Courses taught at P.G. and U.G. Level

S. No.	Paper	Class
1.	Basic Physics	U.G. Level
2.	Laboratory	U.G. Level
3.	Electronics	P.G. Level
4.	Nuclear Physics	P.G. Level
5.	Radiation Physics	P.G. Level
6.	Laboratory	P.G. Level
7.	Mech., Optical, Electronics Workshops	P.G. Level

18. Technical Proficiency

Handling of different types of nuclear physics equipments and radioactive sources. Geometry setting of nuclear and radiation physics experiments for different studies such as measurements of attenuation coefficients, multiple scattering studies, gamma ray spectrometry etc. Preparation and characterization of different type of glasses

19. Administrative Responsibilities

i) Acted as Co-Coordinator: University Enquiry and Information Centre, Punjabi University, Patiala from May 2005 to Dec. 2005

ii) Acted as Coordinator (Exams), Punjabi University, Patiala from Sept. 2005 to Feb.2009.

iii) Acted as Principal, University College Moonak (Sangrur) from July 2012-Sept.2012.

20. List of Publications

In Journals:

1. The K-shell fluorescence yield of Cs.
   K. Singh, **Gurmel Singh**, R.K. Sharma & H.S. Sahota
   Phys. Rev. C 28 (1983) 2115.

2. Absolute pair production cross-section for Z=29 and 50.
   R.K. Sharma, **G.S. Mudahar**, K.Singh & H.S. Sahota
   Ind. J. Phys. 57 A (1983) 302.

3. Optical thickness of soil between source and detector for different γ-ray energies.
   G.S. Mudahar & H. S. Sahota
   J. Hydrol. (Netherlands) 80 (1985) 265.

4. Pair production cross-section at 2.754 MeV for $6 \leq Z \leq 72$.
   G.S. Mudahar, R. K. Sharma & H. S. Sahota

Ind. J. Phys. 59A (1985) 92.

5. Self-diffusion of sodium in soil.
   G.S. Mudahar & H.S. Sahota
   Curr. Sci. 54 (1985) 228.

6. A new method for simultaneous measurements of soil bulk density and water content.
   G.S. Mudahar & H.S. Sahota
   Int. J. Appl. Radiat. Isot. (USA) 37 (1986) 563.

7. Photon attenuation measurements in soil samples of different particle sizes.
   G.S. Mudahar & H. S. Sahota
   Ind. J. Pure Appl. Phys. 24 (1986) 346.

8. Soil compaction studies by gamma ray transmission method.
   G.S. Mudahar, G. Lal & H. S. Sahota
   J. Ind. Soc. Soil Sci. 35, (1987) 723

9. Soil: A radiation shielding material.
   G.S. Mudahar & H. S. Sahota
   Int. J. Appl. Radiat. Isot. (USA) 39 (1988) 21.

10. Effective atomic number studies in different soils for total photon interaction in the energy region 10-5000 keV.
    G.S. Mudahar & H. S. Sahota
    Int. J. Appl. Radiat. Isot. (USA) 39 (1988) 21.

11. Self diffusion of ^{22}Na in different soils.
    G. S. Mudahar & H. S. Sahota
    J. Res. (P.A.U.) 25 (1988) 374.

12. Total and partial mass attenuation coefficients of soil as a function of chemical composition.
    Gurmel S. Mudahar, Sanjay Modi & Makhan Singh
    Int. J. Appl. Radiat Isot. (U.S.A.) 42 (1991) 13.

13. Energy dependence of the effective atomic number of soils.
    Gurmel S. Mudahar, Sanjay Modi & Makhan Singh
    Ind. J. Phys. 65 B (1991) 226.

14. Energy dependence of the effective atomic number of alloys.
    Gurmel S. Mudahar, Makhan Singh & Gurbakhash Singh
    Int. J. Appl. Radiat. Isot. (U.S.A.) 42 (1991) 509.

15. Energy dependence of total photon attenuation coefficients of composite materials.
    Makhan Singh & **Gurmel S. Mudahar**
    Int. J. Appl. Radiat. Isot. (U.S.A.) 43 (1992) 907.

16. Energy dependence of the effective atomic number of low Z materials.
Makhan Singh & **Gurmel S. Mudahar**
Ind. J. Phys. 66B (1992) 425.

17. Effect of sample thickness on the measured mass attenuation coefficients of perspex and bakelite.
Makhan Singh & **Gurmel S. Mudahar**
Ind. J. Phys. 67A (1993) 79.

18. Transmitted photon spectra of gamma rays through a soil medium.
Makhan Singh, G.S. Brar & **Gurmel S. Mudahar**
Nucl. Sci. Engg. (U.S.A.) 114 (1993) 214.

19. Effect of weight fraction of H, C and O on the total mass attenuation coefficients of HCO-materials.
Makhan Singh, Apjit K. Sandhu, G.S. Brar & **Gurmel S. Mudahar**
Int. J. Appl. Radiat. Isot. (U.S.A.) 44 (1993) 1073.

20. Attenuation coefficients of soil as a function of particle size.
Makhan Singh, G.S. Brar & **Gurmel S. Mudahar**
Ind. J. Pure Appl. Phys. 31 (1993) 593.

21. Energy absorption buildup factor studies in water, air and concrete upto 100 mfp using GP fitting formula.
G.S. Brar, Karamjit Singh, Makhan Singh & **Gurmel S. Mudahar**
Int. J. Radiat. Phys. Chem. (U.S.A.) 43 (1994) 623.

22. Exposure buildup factors for bakelite, perspex and magnox A12 upto 40 mfp using interpolation method.
G.S.Brar, Apjit K. Sandhu, Makhan Singh & **Gurmel S. Mudahar**
Int. J. Radiat. Phys. Chem. 44 (1994) 459.

23. A study of energy absorption buildup factors in five different soils.
G. S. Brar & **Gurmel S. Mudahar**
Int. J. Nucl. Geophys. (U.S.A.) 9 (1995) 629.

24. Energy and effective atomic number dependence of the exposure buildup factors in soils - A study.
G. S. Brar & **Gurmel S. Mudahar**
Int. J. Nucl. Geophys. (U.S.A.) 9 (1995) 471.

25. Energy dependence of the energy absorption buildup factors of HCO-materials.
G. S. Brar & **Gurmel S. Mudahar**
Int. J. Radiat. Phys. Chem. 47 (1996) 795.

26. Variation of buildup factors of soils with weight fractions of iron and silicon.
G.S. Brar, G.S. Sidhu, Parjit S. Singh & **Gurmel S. Mudahar**
Int. J. Appl. Radiat. Isot. 49, (1998), 977.

27. Use of low cost detectors in soil water systems.
    Gurmel S. Mudahar, Parjit S. Singh & G.S. Sidhu
    Tech. J. Comm. Instrum. 6 (1998) 165.

28. Buildup factor studies of HCO-materials as a function of weight fraction of constituent elements.
    G.S. Brar, G.S. Sidhu, Parjit S. Singh & **Gurmel S. Mudahar**
    Radiat. Phys. Chem. (U.K.) 54 (1999) 125.

29. Energy absorption buildup factor studies in biological samples.
    G.S. Sidhu, Parjit S. Singh & **Gurmel S. Mudahar**
    Radiat. Prot. Dosim. (U.K.) 86 (1999) 207.

30. Effect of collimator size and absorber thickness on gamma ray attenuation measurements.
    Gurdeep S. Sidhu, Karamjit Singh, Parjit S. Singh & **Gurmel S. Mudahar**
    Radiat. Phys. Chem. (U.K.) 56 (1999) 535.

31. Computation of Geometrical-Progression (G-P) fitting parameters of plastic materials.
    Gurdeep S. Sidhu, Parjit S. Singh & **Gurmel S. Mudahar**
    Ind. J. Phys. 73A (1999) 811.

32. Effect of collimator size and absorber thickness on gamma ray attenuation measurements for bakelite and perspex.
    Gurdeep S. Sidhu, Karamjit Singh, Parjit S. Singh & **Gurmel S. Mudahar**
    Pramana J. Phys. 53 (1999) 851.

33. A study of energy and effective atomic number dependence of the exposure buildup factors in biological samples.
    G.S. Sidhu, Parjit S. Singh & **Gurmel S. Mudahar**
    J. Radiol. Prot. (UK) 20 (2000) 53.

34. A study of transmitted photon spectra of ^{133}Ba through a soil medium.
    Gurdeep S. Sidhu, Karamjit Singh, Parjit S. Singh & **Gurmel S. Mudahar**
    Nucl. Sci Engg. (U.S.A.) 134 (2000) 201.

35. Effect of absorber thickness and beam divergence on gamma-ray buildup factor
    Gurdeep S. Sidhu, Karamjit Singh, Parjit S. Singh & **Gurmel S. Mudahar**
    Ind. J. Phys. 74A (2000) 505.

36. Effect of weight fraction of different constituent elements on the total mass attenuation coefficients of biological materials.
    Karamjit Singh, Charanjeet Singh, Parjit S. Singh & **Gurmel S. Mudahar**
    Parmana J. Phys. 59 (2002) 151.

37. Flyash: A radiation shielding material.
    Karamiit Singh, Charanjeet Singh, Jarnail Singh, Parjit S. Singh & **Gurmel S. Mudahar**

Ind. J. Phys. 77A (2003) 41.

38. Energy and chemical composition dependence of mass attenuation coefficients of building materials
Charanjeet Singh, Tejbir Singh, Ashok Kumar & **Gurmel S. Mudahar**
Annals Nucl. Energy 31 (U.K.) (2004) 1199.

39. Simultaneous effect of collimator size and absorber thickness on the gamma ray buildup factor
Charanjeet Singh, Gurdeep S. Sidhu, Ashok Kumar, Parjit S. Singh & **Gurmel S. Mudahar**
Ind. J. Pure Appl. Phys. 42 (2004) 475.

40. Variation of photon intensities in transmitted photon spectra of ^{60}Co as a function of dimensions of soil medium
Charanjeet Singh, Gurdeep S. Sidhu, Ashok Kumar, Tejbir Singh, Parjit S. Singh & **Gurmel S. Mudahar**
Radiat. Measure. (U.K.) 39 (2005) 451.

41. Molar extinction coefficients of some commonly used solvents
Ashok Kumar, Sukhpal Singh, **Gurmel S. Mudahar** & Kulwant Singh Thind
Radiat. Phys. Chem. (U.K.) 75 (2006) 737

42. Mass attenuation studies in some flyash materials
Sukhpal Singh, Ashok Kumar, Kulwant Singh Thind & **Gurmel S. Mudahar**
Asian J. Chem. 18 (2006) 3314

43. A study of buildup factor under different geometrical conditions for 1332 keV gamma rays
Ashok Kumar, Sukhpal Singh, Kulwant Singh Thind & **Gurmel S. Mudahar**
Asian J. Chem. 18 (2006) 3348

44. Effect of geometrical constraints on the intensity of multiple scattered gamma photons in soil medium.
Tejbir Singh, **Gurmel S. Mudahar** & Parjit S. Singh
Asian J. Chem. 18 (2006) 3361

45. Intensity of transmitted photon spectra as a function of transverse and longitudinal dimensions of soil medium using ^{137}Cs.
Gurdeep S. Sidhu, Tejbir Singh, **Gurmel S. Mudahar** & Parjit S. Singh
Radiat. Protect. Dosim. (U.K.) 121 (2006) 317.

46. UV/VIS spectroscopic analysis of Zinc Lead borosilicate glasses
D. Singh, K. Singh, **G.S. Mudahar**, B.S. Bajwa, D.P. Singh and Manupriya
J. Pb. Acad. Sci. 4 (2007) 13.

47. Studies on effective atomic numbers and electron densities in some commonly used solvents.
Ashok Kumar, Sukhpal Singh, **Gurmel S. Mudahar** & Kulwant S. Thind

Nucl. Sci. Engg. 155 (2007) 102.

48. Barium-borate-flyash glasses: as radiation shielding materials.
Sukhpal Singh, Ashok Kumar, Devinder Singh, Kulwant S. Thind & **Gurmel S. Mudahar**
Nucl. Instrum. Meths. B 266 (2008) 140.

49. Optical and structural properties of ZnO–PbO–B2O3 and ZnO–PbO–B2O3–SiO2 glasses
D Singh, K Singh, **G Singh**, Manupriya, S Mohan, M Arora and G Sharma
J. Phys.: Condens. Matter 20 (2008) **0752208.**

50. Measurements of linear attenuation coefficients of irregular shaped samples by two media method
Sukhpal Singh, Ashok Kumar, Kulwant S. Thind & **Gurmel S. Mudahar**
Nucl. Instrum. Meths. B 266 (2008) 1116.

51. Two media method: an alternative methodology for the measurement of attenuation coefficients of irregular shaped samples
Sukhpal Singh, Ashok Kumar, Kulwant S. Thind & **Gurmel S. Mudahar**
Nucl. Sci Engg. 159 (2008) 338.

52. Optical and Structural properties of Li_2O-Al_2O_3-B_2O_3 glasses before and after irradiation effects
D. Singh, K. Singh, B.S. Bajwa, **G. S. Mudahar,** D. P. Singh, Manupriya M.Arora & V.K.Dangwal.
J. Appl. Phys 104 (2008) 103515.

53. Effects of finite Sample dimensions and total scatter acceptance angle on the gamma ray buildup factor
Sukhpal Singh, Ashok Kumar, Charanjeet Singh, Kulwant Singh Thind, and **Gurmel S. Mudahar,**
Annals of Nucl. Energy 35 (2008) 2414.

54. Structural characterization of fly ash doped lithium borate glasses.
Jarnail Singh, **Gurmel Singh**, Neetu Chopra, Gagandeep Singh and Gopi Sharma,
Asian J. Chem., 21 (2009) 148.

55. Study of CSDA and extrapolated ranges of electrons in some selected solvents in the energy range of 0.01-100 MeV.
Ashok Kumar, B. S. Salaria, Sukhpal Singh, Balkrishan, Charanjit Singh and **G. S. Mudahar**,
Asian J. Chem., 21 (2009) 130.

56. Optical absorption and infrared spectroscopic analysis of irradiated ZnO-BaO-B_2O_3 glasses.
D. Singh, K.S. Thind, **G. S. Mudahar**, B. S. Bajwa,
Nucl. Instrum. Meths B 268 (2010) 3340

57. Buildup of gamma ray photons in flyash concretes: A study
Sukhpal Singh, S.S Ghuman, Charanjeet Singh , Kulwant Singh Thind and **Gurmel S. Mudahar**,
Annals of Nucl. Energy 37 (2010) 681.

58. Structural and optical investigation of B_2O_3-Na_2CO_3-ZnO glasses
Vandana, S. P. Singh, **Gurmel S. Mudahar**, and K. S. Thind.
Int. J. Phys. Appl. 4 (2012) 23.

59. Structural investigation of B_2O_3-Na_2CO_3-CuO glasses by Molar Volume Measurements and FTIR spectroscopy
Vandana, S. P. Singh, Devinder Singh, Gopi Sharma and **Gurmel S. Mudahar**
Int. J. Appl. Phys. 2 (2012) 1.

60. Synthesis and optical characterization of silver doped sodium borate glasses
Vandana Sharma, Supreet Pal Singh, **Gurmel S. Mudahar**, and Kulwant S.Thind
New J. Glass & Ceramics 2 (2012) 111.

61. Synthesis and characterization of cadmium containing sodium borate glasses
Vandana Sharma, Supreet Pal Singh, **Gurmel S. Mudahar**, and Kulwant S.Thind
New J. Glass & Ceramics 2 (2012) 128.

62. Structural Investigation of B_2O_3- Li_2CO_3- Al_2O_3 glasses by molar volume measurements and FTIR spectroscopy
M. Kaur, S.P. Singh, D.S. Mudahar, **G.S. Mudahar.**
Mat. Phys. Mech. (2012) **in press.**

63. Optical characterization of sodium borate glasses with different glass modifier
Jarnail Singh, S. P. Singh, Devinder Singh, **Gurmel Singh**, K. S. Thind.
Int. J. Phys. Res. (2012) **in press.**

64. Structural investigation of gamma irradiated PbO Glasses
D. Singh, **G. S. Mudahar** and K.S. Thind.
Mater. Struc. (Communicated)

In Symposiums/Conferences/Seminars:

1. Single source dual energy method for soil-water characteristics.
   G.S. Mudahar & H.S. Sahota
   6th Symp. X- and gamma-ray sources & Appl. (USA) (1985).

2. Ionic diffusion of Hg-203 in soils affected by $CaCO_3$ content and organic carbon.
   G.S. Mudahar & H.S. Sahota.
   Symp. Radiat. Phys. (Patiala) (1985)

3. Use of gamma radiation for sodium diffusion in soils.
   G.S. Mudahar, G.Lal & H.S. Sahota
   Int. Symp. Radiat. Phys. (Italy) (1985) 178.

4. Effect of mass number on maximum ion diffusion in soils.
   G.S. Mudahar & H.S. Sahota
   Symp. Radiat. Phys. (Patiala) (1985)

5. Diffusion of radioactive ions in soils.
   G.S. Mudahar & H.S. Sahota
   Int. Symp. Artifi. Radioact. (1985) PAR-14

6. Pair production cross-sections at 1.598 photon energy for $22 \leq Z \leq 72$
   R. K. Sharma, **G.S. Mudahar** & H. S. Sahota
   Symp. Radiat. Phys. (Patiala) (1985)

7. Effect of some soil chemical properties on the self diffusion of ^{22}Na.
   G.S. Mudahar & H.S. Sahota
   Radiochem. Radiat. Chem. Symp. (Kanpur) (1985).

8. Attenuation of gamma ray through soil water system.
   G.S. Mudahar & H.S. Sahota
   Int. Symp. Radiat. Phys. (Italy) (1985) 179.

9. Dual energy method for soil water characteristics.
   H.P. Singh, **G.S. Mudahar** & H.S. Sahota
   Radiochem. Radiat. Chem. Symp. (Tirupati) (1986).

10. A new version of gamma ray transmission method for soil bulk density and moisture measurements.
    G.S. Mudahar & H. S. Sahota
    6th Natl. Symp. Radiat. Phys. (1986)

11. Effect of applied Hg on mercury diffusion in soil.
    G.S. Mudahar, G. Lal & H. S. Sahota
    6th Natl. Symp. Radiat. Phys. (1986)

12. Effect of temperature and diffusion period on the diffusion of Hg^{203} in soil
    G.S. Mudahar & H. S. Sahota

Radiochem. Radiat. Chem. Symp. (BARC, Bombay) (1988)

13. Energy dependence of effective atomic number of different soils.
G.S. Mudahar & H. S. Sahota
Natl. Sem. At. Inner-shell Ioniz & Analy. Appl. (Patiala) (1988) 22.

14. Effective atomic number studies of soils.
Makhan Singh & **Gurmel S. Mudahar**
8th Natl. Symp. Radiat. Phys. (1990) 97

15. Mass attenuation studies of alloys.
Makhan Singh, Sanjay Modi & **Gurmel S. Mudahar**
8th Natl. Symp. Radiat. Phys. (1990) 18

16. Transmitted photon spectra of gamma ray through soil.
Makhan Singh & **Gurmel S. Mudahar**
9th Natl. Symp. Radiat. Phys. (1991)

17. A statistical approach for predicting accuracies of soil properties measured by single beam gamma-method
Makhan Singh, Apjit Kaur Sandhu & **Gurmel S. Mudahar**
2nd Topical Meeting on Indus. Radiat. Radioisot. Measur. Appl. (U.S.A.) 1992

18. Energy dependence of the buildup factors of soils.
G. S. Brar & **Gurmel S. Mudahar**
4th Symp. Radiat. Phys. (PTA) (1994) 16.

19. Effect of weight fractions of iron and silicon on exposure buildup factors of soils.
G. S. Brar & **Gurmel S. Mudahar**
11th Natl. Symp. Rad. Phys. (Patiala) (1995) 285

20. Buildup factor studies in composite materials.
G. S. Sidhu, Parjit S. Singh, **Gurmel S. Mudahar**, G. S. Brar & Makhan Singh
5th Symp. Rad Phys. (1997) 22.

21. Transmission photon spectra of gamma rays through composite materials.
G. S. Sidhu, G. S. Brar, Makhan Singh, Parjit S. Singh & **Gurmel S. Mudahar**
5th Symp. Rad. Phys. (1997) 26.

22. Behavior of gamma ray interactions in composite materials.
G. S. Sidhu, Parjit S. Singh, **Gurmel S. Mudahar**, G. S. Brar & Makhan Singh
First Pb. Sci. Cong. (1997) 32.

23. Gamma ray transmission method and soil water studies.
G.S. Sidhu & **Gurmel S. Mudahar**
Int. Symp. Nucl. Related Tech. Agric., Indust., Health & Envir. (Cuba) (1997).

24. Low-Z radiation shielding materials.
G.S. Sidhu, Parjit S. Sandhu & **Gurmel S. Mudahar**
2nd Pb. Sci. Cong., Amritsar (1998) 28.

25. An interpolation method to generate buildup factor data of composite materials.
G. S. Sidhu, Parjit S. Singh & **Gurmel S. Mudahar**
12th Natl. Symp. Radiat. Phys. (Jodhpur) (1998) 289

26. Total mass attenuation coefficients of plastic materials as a function of chemical composition.
Gurdeep S. Sidhu, Karamjit Singh, Parjit S. Singh & **Gurmel S. Mudahar**
6th Symp. Radiat. Phys. Patiala. (1999) 8-9.

27. Gamma ray buildup and multiple scattering studies in low-Z composite materials
Gurdeep S. Sidhu, Parjit S. Singh , **Gurmel S. Mudahar**, H.S. Sahota, Makhan Singh & G.S. Brar
6th Symp. Radiat. Phys. Patiala. (1999) 15-16.

28. Energy dependence of exposure buildup factors in plastic materials
Gurdeep S. Sidhu, Karamjit Singh, Parjit S. Singh, **Gurmel S. Mudahar** & M.S. Powar
6th Symp. Radiat. Phys. Patiala. (1999) 29.

29. The dependence of energy absorption buildup factors on energy and effective atomic number in plastic material.
Gurdeep S. Sidhu, Karamjit Singh, Parjit S. Singh & **Gurmel S. Mudahar**
13th Natl. Symp. Radiat. Phys. held at Mangalore (1999) 465.

30. Multiple scatter peak as a function of absorber dimensions.
Gurdeep S. Sidhu, Karamjit Singh, Parjit S. Singh & **Gurmel S. Mudahar**
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